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EXAMINER
CHOO, MUNSOON

ART UNIT	PAPER NUMBER
2617	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
	10/558,829	XU ET AL.
Office Action Summary	Examiner	Art Unit	
	MUNSOON CHOO	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS,
WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>28 December 2006</u>.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-11</u> is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1,2,10 and 11</u> is/are rejected.

7) ☒ Claim(s) <u>3-9</u> is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on <u>29 November 2005</u> is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a) ☒ All   b) ☐ Some *   c) ☐ None of:

       1. ☐ Certified copies of the priority documents have been received.

       2. ☐ Certified copies of the priority documents have been received in Application No. _____.

       3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Drawings

1.   The drawings are objected to because (1) in figure 1, the y-axis is missing unit

measurement and description, the x-axis is missing number (for the unit), unit

measurement, and description. There are two horizontal straight lines across this graph,

the first one is between 0 and 1000 and the second one is between 1000 and 2000.

These two straight horizontal lines need reference numbers and description. Reference

numbers for the paths and side lopes in figure 1 are required; please clearly point out

the paths and side lopes of figure 1. (2) In figure 2, please provide clear description for

y-axis, x-axis, and the two straight horizontal lines as described in (1) above. Please

provide reference numbers and specifically point out the first path and second path in

figure 2. (3) In figure 8, Please provide reference numbers and specifically point out

which line is for "ordinary method of first-path detection" and "method of first-path

detection in accordance with embodiment of invention". Corrected drawing sheets in

compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid

abandonment of the application. Any amended replacement drawing sheet should

include all of the figures appearing on the immediate prior version of the sheet, even if

only one figure is being amended. The figure or figure number of an amended drawing

should not be labeled as "amended." If a drawing figure is to be canceled, the

appropriate figure must be removed from the replacement sheet, and where necessary,

the remaining figures must be renumbered and appropriate changes made to the brief

description of the several views of the drawings for consistency. Additional replacement

sheets may be necessary to show the renumbering of the remaining figures. Each

drawing sheet submitted after the filing date of an application must be labeled in the top

margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If

the changes are not accepted by the examiner, the applicant will be notified and

informed of any required corrective action in the next Office action. The objection to the

drawings will not be held in abeyance.

Allowable Subject Matter

2.   Claim 3-9 are objected to as being dependent upon a rejected base claim, but

would be allowable if rewritten in independent form including all of the limitations of the

base claim and any intervening claims.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed
> or described as set forth in section 102 of this title, if the differences between the
> subject matter sought to be patented and the prior art are such that the subject
> matter as a whole would have been obvious at the time the invention was made
> to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was
> made.

4.   Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over

Applicant's admitted prior art (hereinafter "Applicant"), and further in view of Ohsuge,

Michihiro (EP 1,126,626 A2, hereinafter "Ohsuge"), Dahlback et al. (US 2004/0042411,

hereinafter "Dahlback") and Araya et al. (US 7,133,436 B2, hereinafter "Araya").

Re claim 1, Applicant discloses a method of precise first-path detection in CDMA

mobile communications systems, the method comprising the steps of:

a. calculating the noise threshold for the first-path detection according to the multi-path

profile;

(Applicant, background, page 2, top half: Obtain (calculate) the noise threshold of

the multi-path profile)

Also disclosed by:

(Araya: Figure 19, reference SE1)

But Applicant fails to disclose:

b. judging whether there is a maximum point exceeding the noise threshold in the multi-

path profile,

if yes, carrying out side-lobe suppression at the maximum point which exceeds the

noise threshold and obtaining candidate first path;

otherwise, deciding that no first path exists,

and exiting the entire process of first-path detection;

c. judging according to the location of the candidate first path whether the first path is

ambiguous,

if yes, carrying out correction of first-path ambiguity, and outputting the corrected

location of final first path;

otherwise, outputting the location of candidate first path as the location of final first path.

Ohsuge, Dahlback and Araya disclose:

b. judging whether there is a maximum point exceeding the noise threshold in the multi-path profile,

(Applicant, background, page 2, top half: Search (determine or judge) the first maximum point exceeding the noise threshold in the multi-path profile)

Also disclosed by:

(Araya: Figure 19, reference SE3)

if yes, carrying out side-lobe suppression at the maximum point which exceeds the noise threshold

(Ohsuge, figure 12, paragragphs [0078]-[0079]: Side lobe portion can be eliminated (suppressed) from the profile peak (Applicant's admitted prior art, page 2, top half: "the maximum point exceeding the noise threshold" is disclosed.

and obtaining candidate first path

(Applicant, page 2, top half: the location of this maximum point will be determined as the first path);

otherwise, deciding that no first path exists,

(Dahlback: paragraph [0040])

and exiting the entire process of first-path detection;

(Araya, figure 19, reference SE3: When the reference path is not larger than the threshold, the process ends)

Also disclosed by:

(Ohsuge, figure 9: Reference s17 is suppression, and in reference s20, if the

result is "NO", the entire process end   )

c. judging according to the location of the candidate first path whether the first path is

ambiguous,

(Ohsuge, paragraph [0014] and [0019]: "Path is located close in one chip" and

"correlated peaks (path) is narrow to cause overlap" are considered as the path

being ambiguous)

Also:

(Ohsuge, paragraphs [0072]-[0074], figure 10A to 10C: in figure 10A, notice the

first path is on the left, and is being detected as position 1. The paths are to be

separated to perform detection)

if yes, carrying out correction of first-path ambiguity,

(Ohsuge, paragraph [0019]: "The multi-path can be precisely separated into each

individual path" is a way of carrying out correction for the path ambiguity)

and outputting the corrected location of final first path;

Araya, figure 21, column 4 line 54 to column 5 line 5: H2 is close to H1 (first-path

ambiguous), and H2 is masked and removed, and therefore carrying the

correction as being claimed.

otherwise, outputting the location of candidate first path as the location of final first path.

(Ohsuge, figure 5a: in case of one path)

Motivation to combine may be gleaned from the prior art contemplated. Therefore, one skilled in the art would have found it obvious from the combined teachings of Applicant, Ohsuge, Dahlback and Araya as a whole to produce the invention as claimed with a reasonable expectation of implementing "side-lope suppression" and "correction for ambiguous first-path" for the first path detection in CDMA.

5.   Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant, Ohsuge, Dahlback and Araya as applied to claim 1 above, and further in view of Jasper et al. (US 005,140,615A, hereinafter "Jasper").

Re claim 2, Applicant, Ohsuge, Dahlback and Araya as a whole disclose a method according to claim 1, but fail to disclose in step c, if the first path is not ambiguous, before outputting the location of final first path, the method further comprising:

Step d: carrying out conic interpolation computation for the candidate first path and obtaining the location of final first path according to the result of the interpolation computation.

Jasper discloses:

Step d: carrying out conic interpolation computation for the candidate first path and obtaining the location of final first path according to the result of the interpolation computation. **(Jasper, figure 5, column 3 lines 50 to 53)**

It would be obvious to one of ordinary skill in the art to modify Applicant, Ohsuge, Dahlback and Araya and have conic interpolated channel gain estimates between the pilot sample times as taught by Jasper, thereby will combine the method of max-ratio and a diversity system to counteract the effects of channel fading on a transmitted information signal as discussed by Jasper.

6.   Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Araya, further clarified by Applicant, and further in view of Ohsuge.

Re claim 10, Araya discloses a n apparatus of precise first-path detection in CDMA mobile communications systems, the apparatus comprising at least a module for noise threshold calculation, a module for side-lobe suppression, and a module for first-path ambiguity detection and correction, wherein:

the module for noise threshold calculation is for use in receiving the multi-path profile from the matched filtering module,

(Araya, column 1 lines 58 to 63)

Also disclosed by:

(Ohsuge, figure 1, reference 11 and 12)

calculating the noise threshold for the first-path detection according to this multi-path profile,

(Araya: Figure 19, reference SE1)

Also disclosed by:

(Applicant, background, page 2, top half)

and then outputting this noise threshold to the module for side-lobe suppression;

(Figure 20, column 4 lines 31-45: G1 and G2 are thresholds. F4, F5 and F6 are below G1 and G2 and are not considered for rake-combined. F4, F5 and F6 are masked (side-lope suppressed).)

Also disclosed by:

(Ohsuge, figure 12, paragragphs [0078]-[0079]: Outputting the graph of first path detection with side lopes, then side lope can be eliminated (suppressed). Although noise threshold isn't in this graph, is disclosed in Araya)

the module for side-lobe suppression is for use in finding the candidate first path

(Column 4 line 54 to column 5 line 5, figure 21: Base on Araya's mentioned second well-known reference, H2 is removed (masked) and H1 is the first path. Also note that when time is 155, it is the peak of a side lope, and since it is not considered as first path, then it (side lope) is suppressed)

Also disclosed by:

(Ohsuge, figure 12, paragragphs [0078]-[0079]: In figure 12, after the side lope on the left side of the graph is eliminated, then the first path will be detected)

and carrying out side-lobe suppression based on the received noise threshold using the processing method of side-lobe suppression,

(Araya, figure 20, column 4 lines 31 to 45: Base on G1 and G2, F4, F5 and F6 are

below threshold and not to be rake-combined (suppressed))

Also disclosed by:

(Ohsuge, figure 12, paragragphs [0078]-[0079]: Side-lope suppression is

disclosed. Although noise threshold isn't in Ohsuge, it is in Araya)

and then outputting the candidate first path to the module for first-path ambiguity

detection and correction;

(Column 4 line 54 to column 5 line 5, figure 21: H2 is removed to improve first-

path ambiguity detection and correction)

and the module for first-path ambiguity detection and correction is for use in carrying out

first-path ambiguity detection according to the received location of the candidate first

path,

(Araya figure 21: H1 is the first path and its location is noted. H2 is masked to

carry out detection for first-path ambiguity)

Also disclosed by:

(Ohsuge, paragraphs [0072]-[0074], figure 10A to 10C: in figure 10A, notice the

first path is on the left, and is being detected as position 1. The paths are to be

separated to perform detection)

if there is first-path ambiguity, making first-path ambiguity correction to obtain the

corrected location of final first path;

(Araya, figure 21, column 4 line 54 to column 5 line 5: H2 is close to H1 (first-path

ambiguous), and H2 is masked and removed, and therefore carrying the

correction as being claimed)

However, Araya didn't disclose:

if there is no first-path ambiguity, just outputting the location of candidate first path.

Ohsuge does.

(Ohsuge, figure 5a: in case of one path)

It would be obvious to one of ordinary skill in the art to modify Araya and have

only one path in the delay profile as taught by Ohsuge, thereby will obtain a more stable

reception performance and multi-path detection as discussed by Ohsuge.

7.   Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Araya,

Applicant, and Ohsuge as applied to claim 10 above, and further in view of Jasper.

Re claim 11, Araya and Ohsuge as a whole disclose an apparatus according to

claim 10, but fail to disclose the apparatus further comprising:

a module for conic interpolation, which is for use in receiving the candidate first path

without first-path ambiguity from the module for first-path ambiguity detection and

correction,

calculating the location of final first path according to the conic interpolation formula for

first-path calibration, and outputting the calibrated location of final first path.

Jasper discloses:

a module for conic interpolation, which is for use in receiving the candidate first path

without first-path ambiguity from the module for first-path ambiguity detection and

correction,

calculating the location of final first path according to the conic interpolation formula for

first-path calibration, and outputting the calibrated location of final first path.

(Jasper, figure 5, column 3 lines 50 to 53)

It would be obvious to one of ordinary skill in the art to modify Araya and Ohsuge

and have conic interpolated channel gain estimates between the pilot sample times as

taught by Jasper, thereby will combine the method of max-ratio and a diversity system

to counteract the effects of channel fading on a transmitted information signal as

discussed by Jasper.

Contact

Any inquiry concerning this communication or earlier communications from the
examiner should be directed to MUNSOON CHOO whose telephone number is
(571)270-7140. The examiner can normally be reached on Monday through Friday
7:30am to 5pm.
If attempts to reach the examiner by telephone are unsuccessful, the examiner's
supervisor, Nick Corsaro can be reached on (571)272-7876. The fax phone number for
the organization where this application or proceeding is assigned is 571-273-8300.
Information regarding the status of an application may be obtained from the
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USPTO Customer Service Representative or access to the automated information
system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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